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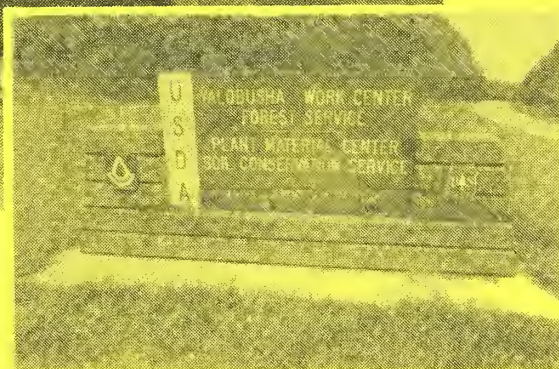
Conservation
Service

Jackson, MS



Coffeeville Plant Materials Center Coffeeville, Mississippi

Report of Activities — 1984



Including Field Plantings in Arkansas, Louisiana and Mississippi

COFFEEVILLE PLANT MATERIALS CENTER

COFFEEVILLE, MISSISSIPPI

Report of Activities -- 1984

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INTRODUCTION

The Coffeeville Plant Materials Center (PMC) is one of 24 centers operated by the Soil Conservation Service (SCS). The Plant Materials program began soon after the SCS was founded in 1935. Its purpose is to select improved plant cultivars and develop better methods for the prevention of soil erosion using plants. Nationwide, the SCS Plant Materials program has participated in the testing and release of over 250 superior varieties. Many of these are well adapted to the South. The most outstanding of these is probably 'Pensacola' bahiagrass.

HISTORY

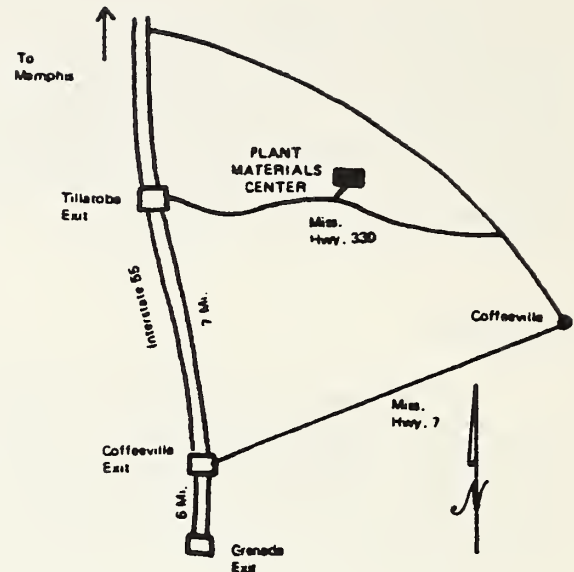
Many changes in what is now the Coffeeville Plant Materials Center have taken place since the land was acquired by the government in the 1930's under the Land Utilization Project. During the midst of the "dust bowl" and "great depression" the land was ravaged by erosion, and the SCS through its Yazoo-Little Tallahatchie Flood Prevention Project was instrumental in greatly reducing erosion in the area. In 1957, the land was transferred to the U. S. Forest Service with the SCS using about 500 acres on a long-term lease agreement for its Flood Prevention Project. On August 8, 1960, the Coffeeville Plant Materials Center began using about 200 acres of flood prevention seed unit land. V. E. Ahlrich was the first manager; since 1970 B. B. Billingsley, Jr., has been the manager. In 1982, the Seed Unit was discontinued and the entire operation dedicated to Plant Materials. In 1984, portions of the land in excess of that needed for Plant Materials was set aside to give SCS employees training in current conservation practices.



Photograph taken in 1938 by J.L. Godwin in Yalobusha County, Mississippi near the Coffeeville Plant Materials Center.

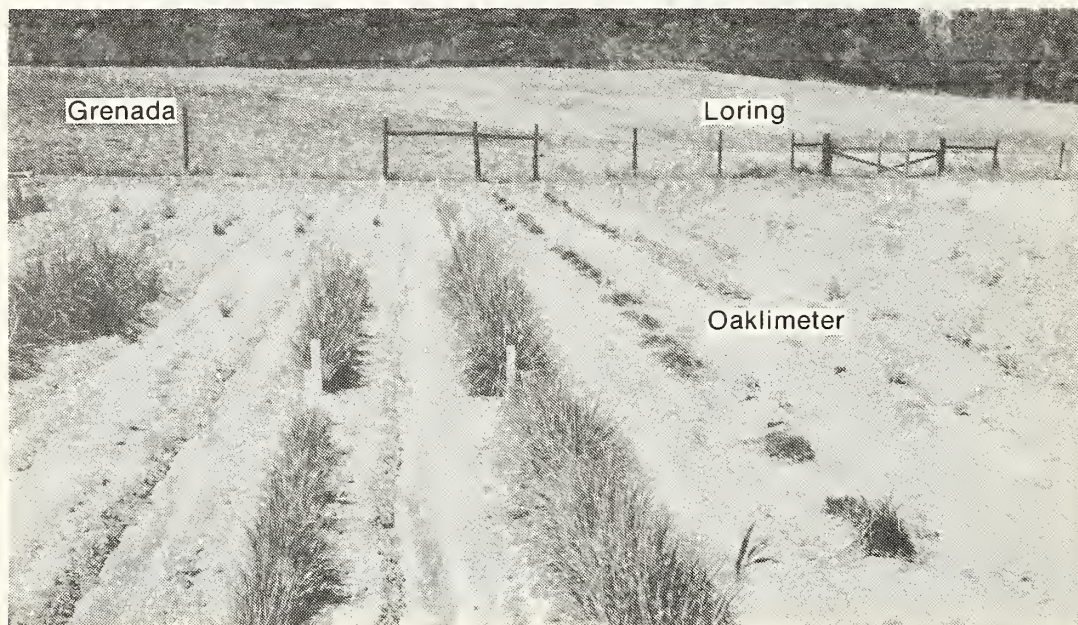
Location

The Coffeeville Plant Materials Center is located in north-central Mississippi within the Holly Springs National Forest about 6 miles west of the town of Coffeeville. To visit the Center, one may take the Tillatoba exit off Interstate 55 and travel 4.5 miles east on Mississippi Highway 330.



Soils

Most work at the Plant Materials Center is conducted in the nearly-level bottom land on Oaklimeter silt loam. These soils are naturally very acid and wet, but they can be very productive with proper water control and drainage. Loring and Grenada silt loams with fragipans dominate the slopes.



Weather

Flooding at the Center was not the problem that it was in 1983. Annual rainfall of 57 inches was about average, October was much wetter than normal and received 11.03 inches, the most rainfall of any month. September was the driest month with only 0.22 inches of rainfall. A severe drought from mid-August to early October adversely affected plant growth. A wetter than normal May made spring planting and other work difficult.

Severe winter injury to many plants was evident in the spring of 1984. Most of the injury was caused by a severe cold period in December of 1983. Temperatures in 1984 were near normal except for November and December. November was warmer than normal with December much above normal. This extended warm period caused some woody plants to break dormancy and seeds of many warm-season plants germinated. The growing season of 243 days was much longer than usual. Weather records are summarized in Table 1.

TABLE 1. TEMPERATURE AND PRECIPITATION AT COFFEEVILLE PLANT MATERIALS CENTER

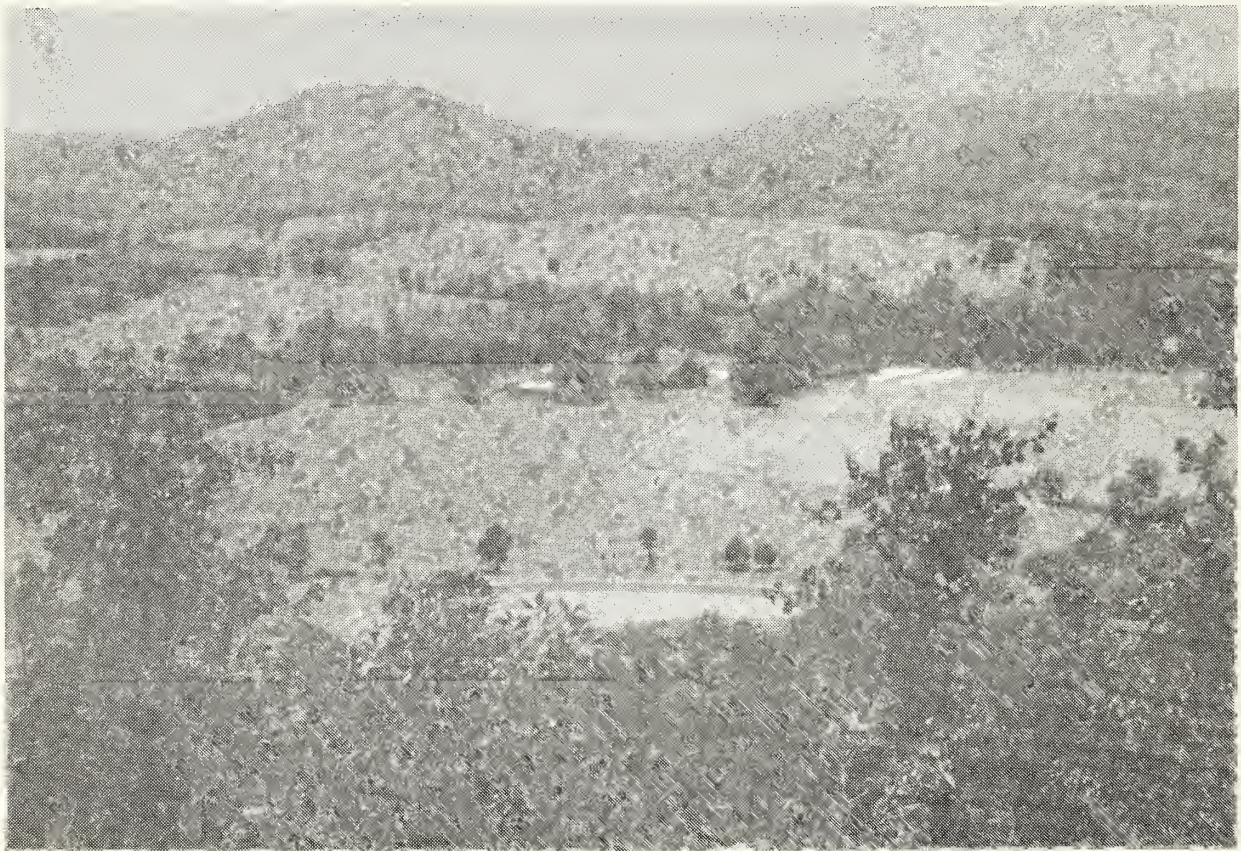
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
<u>Temperature (°F)</u>														
Extreme 1984	High	64	69	77	85	90	93	95	94	96	83	76	76	96
	Low	8	14	21	34	43	46	61	62	49	39	24	15	8
Average 1984	High	45	57	60	68	80	89	89	86	84	75	59	60	71.0
	Low	27	35	41	48	58	66	70	70	63	58	38	44	51.5
Average 1975-1983	High	44	50	61	70	77	88	91	89	83	71	59	50	69.4
	Low	28	34	43	51	61	69	74	72	64	49	41	32	51.5
<u>Precipitation (in.)</u>														
Total	1984	2.58	4.53	5.01	6.58	8.36	3.10	4.33	3.86	0.22	11.03	6.48	0.92	57.00
Average 1969-83		5.44	4.32	7.48	6.38	5.79	4.54	4.46	2.72	4.24	3.40	5.96	6.48	61.21

SERVICE AREA

The PMC service area covers a major portion of Arkansas, Louisiana, and Mississippi. Significant areas of Alabama and Tennessee are included. Climate is humid and temperate. Rainfall is approximately 50 inches for most of the area. Droughts in late summer and autumn are common. Temperature increases from north to south. Summer temperatures of 90° to over 100°F are commonly accompanied by high humidity. Winters are mild in the southern part. Snowfall accumulations are common only in the north. Soil, vegetation, topography, and land usage are closely related to the major resource areas.

MLRA 118: ARKANSAS VALLEY AND RIDGES

The long, narrow valleys and ridges are the result of differential weathering of folded beds of sandstone and shale. The ridges are mostly forested by oak, hickory, and pine. Most of the remaining land is pasture. Small grain and hay are major crops, but vineyards, orchards, vegetables and soybeans are important locally.



Valley and ridge scene in Johnson County, Arkansas. Pasture and valleys have Leadvale, Cane, and Taft soils. Soils of the wooded ridges are Nella, Enders, and Mountainburg.

MLRA 131: SOUTHERN MISSISSIPPI VALLEY ALLUVIUM

Much of the flat fertile land, commonly referred to as "the Delta," is in cotton and soybeans. Rice, sugarcane, and catfish are important in some locations. Natural vegetation is bottomland hardwoods. Controlling surface water and artificial drainage are major concerns of management.



Cotton harvest in Sharkey
County, Mississippi

MLRA 133B: WESTERN COASTAL PLAIN



Woodland range near Leesville, Louisiana

Pine-hardwood forests cover most of the area. Lumber and pulpwood are important products. Most cleared land is in pasture and hay. Summer droughts are common in the predominantly sandy soil.

MLRA 134: SOUTHERN MISSISSIPPI VALLEY SILTY UPLANDS



Both cropland and streambank erosion are major problems in the silty, loessal soils. Land use is variable with about half being forest or mixed hardwoods and pine. Cleared land is mostly used for soybeans, cotton, corn, and wheat. Areas of forest and hay are being converted to row crops, increasing the problems for erosion.

MLRA 135: ALABAMA, MISSISSIPPI AND ARKANSAS BLACKLAND PRAIRIE

Only small remnants of the former prairie vegetation remain. The heavy, shrink-swell soils derived from soft limestone or chalk are very susceptible to erosion. Most of the land is pasture or unproductive woodland of hardwoods and redcedar.



Pastureland in the "Black Belt" near Livingston, Alabama

LONG RANGE PROGRAM

Conservation problems for the Plant Materials Center service area are identified in the Plant Materials Center Long Range Program. Once the priorities have been established by the State Conservationists' Advisory Committee, the Plant Materials Center develops project plans to solve the problems given the highest priority.

HIGH PRIORITY: CROPLAND

Erosion on cropland results from continuous cropping without conservation systems, absence of an adequate winter cover, and farming steep land not suited to continuous row cropping. Plants are being assembled to evaluate for use in conservation tillage, grassed waterways damaged by herbicides, field borders, and to supplement ordinary engineering practices. Plants that fix nitrogen are especially desirable.



MEDIUM PRIORITY: PASTURELAND



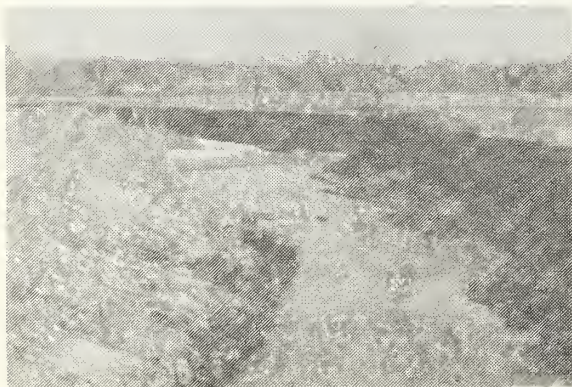
Warm-season grasses for the northern part of the service area and cool-season grasses to replace fescue to the south are two problems needing improved plants. A legume that is more compatible with grasses is also a need.

MEDIUM PRIORITY: WOODLAND

Better plants for clear-cut sites and other clearings in pine plantations are needed. Also commercially valuable timber for eroded Blackland Prairie soils is desired.



MEDIUM PRIORITY: CRITICAL AREAS



Plants are needed to control erosion on many streambanks and impoundments in the service area. Bare areas resulting from oil well operation and industrial wastes need vegetation.

MAJOR ACTIVITIES IN 1984

The Plant Materials Program includes a series of seven steps. It is designed to determine the adaptiveness and performance of the plants and to insure an adequate supply of materials. From start to finish, the process requires about 15 years.

STEP 1: ASSEMBLY

After problems and priorities have been determined, the PMC begins to assemble plant materials that have the potential to solve priority problems. Plant collections may come from a variety of sources, both foreign and native. At the PMC, each collection is given a unique accession number for identification throughout the testing program. Assemblies are of two kinds, major and miscellaneous. The major assembly is made to locate the variety with the "best genes." It consists of a number of collections (ideally 100 or more) of the same species from as wide a range of climatic and soils conditions as possible. Miscellaneous assemblies of assorted species are also tested to determine if a species or cultivar might be useful in a specific situation.

Major Assemblies in Progress

Prostrata Lespedezas
Lespedeza sp.

These are short species somewhat like the introduced annual lespedezas. They are common but rarely abundant in dry woods and openings. They serve as food for wildlife, but very little more is known of their potential. This plant is being collected because it has potential for nitrogen-fixation and wildlife use along field borders. It may also be useful for clear cut areas and clearings within forests. Less than 10 collections were made in 1984. More collections are scheduled in 1985.



Trailing Lespedeza
Lespedeza Procumbens Michx

Bahiagrass
Paspalum notatum Fluegge

A cold-tolerant bahiagrass is desired to extent the range of this valuable grass farther north than 'Pensacola' is commonly grown. 'Wilmington' bahiagrass, which is more winter-hardy, does not reliably produce seeds in quantity, any bahiagrass, roughly north of Coffeetown, that has withstood the past two severely cold winters is desired. In 1984 the Plant Materials Center only received 4 collections. More are planned for 1985.

Sensitive Plant, Shame Vine
Mimosa strigillosa Torr. and Gray

This perennial legume forms a low, dense ground cover. It has potential for use in conservation tillage, field borders and roadsides. The PMC obtained about 10 accessions in 1983. More are scheduled in 1984.

Major Assemblies Completed

Upright Lespedezas
Lespedeza sp.

These are upright lespedezas similar to sericea. The native species are scattered in dry, open woods. They are used by wildlife, but have been widely used otherwise. At the end of 1984, the Plant Materials Center had received 27 accessions; 12 were from Mississippi, six from Arkansas, and nine from Louisiana. Because of the small number, several accession of sericea lespedeza will be included and the entire assembly planted in 1985.

Trailing Wild Bean
Strophostyles sp.

This is a twining, perennial legume that has potential for use for nitrogen-fixation with forage grasses and for wildlife food along field borders and forest clearings. About 30 accessions have been received at the Plant Materials Center. Four were from Arkansas, two from Louisiana, and six from Mississippi. Most of the remainder came from the Knox City Plant Materials Center in Texas.

Miscellaneous Species

Besides major assemblies, the PMC obtained a large assortment of other plants to evaluate for conservation use. Some are released varieties that are to be re-evaluated for purposes other than their common usage. Some are introduced species to be observed to see if they are adapted to the service area. Many were provided by seed dealers. Some were collected by interested individuals. The PMC encourages individuals to contribute plant materials to testing for control erosion. They may be for a major assembly, or they may be a especially vigorous plants growing under adverse conditions.

A large assortment of commercial varieties of seeds have been supplied to the Coffeenville PMC by various companies to determine the best for cover crops and no-till.



Red clover
Trifolium pratense



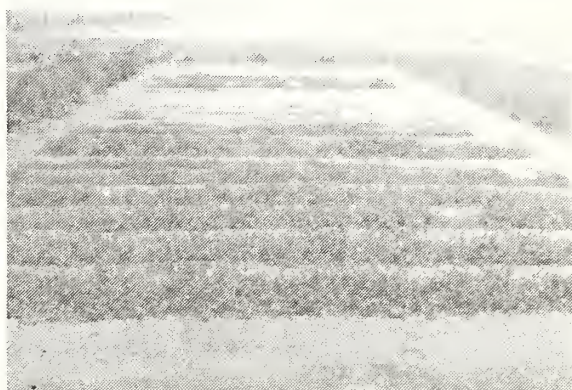
Crimson clover
Trifolium incarnatum

STEP 2: INITIAL EVALUATION

After the seeds or plants arrive at the Plant Materials Center and are given an accession number, they are planted in rows or small plots. Accessions in each assembly are planted in group for easier and more meaningful comparison. Periodically PMC personnel evaluate the plants for vigor, seed production, resistance to disease insects, and tolerance to heat, drought, and cold. Also, plants are measured and dates of flowering and maturity recorded. Initial evaluation was begun for one major assembly, beaked panicgrass, in 1984.

Beaked Panicgrass Panicum anceps Michx.

The perennial, warm-season grass occurs over a wide range from New Jersey to Texas. It tolerates shade and low fertility, making it potentially useful in a variety of situations where little or no maintenance is available. In 1984 91 accessions were planted and evaluated. Forty-five were from Arkansas, eight from Louisiana, and 20 from Mississippi. Most of the remainder were supplied by the PMC at Quicksand, Kentucky.



Beaked panicgrass in rod rows at the Coffeeville PMC

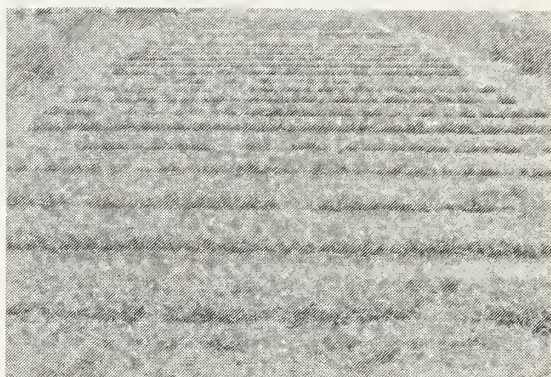
Other Major Assemblies

Partridge Pea (Cassia fasciculata)
Purpletop (Tridens flavus)
Illinois Bundleflower (Desmanthus illinoensis)

Evaluations continued in 1984 for these plants. No superior plants have been selected. As the evaluations progress, important decisions will be reported in this report. At the end of the evaluation, a technical paper will be prepared, and superior accessions, if any, will be selected for advanced evaluations.

Miscellaneous Evaluations

These include field collections that are too few to comprise a major assembly or named varieties that have already been released. They are evaluated to determine how well they are adapted. If any of these show potential for solving identified conservation problems, they will be included in advanced evaluations. Several accessions of grasses, legumes, and forage brassicas were planted in the fall of 1984 but time has not been sufficient to fully evaluate and analyze the data.



Over 100 assorted varieties of grasses and forbs, mostly legumes, are being evaluated for use in waterways and in no-till trials.

Cooperative Evaluations

Plant materials centers across the nation cooperate to determine the range where promising plants may be successfully grown. Most come individually or in small groups. In 1983, small groups (5-30) of the following were comparatively evaluated at Coffeetown.

<u>Species</u>	<u>Source</u>	<u>Completion</u>
Yellow bluestem (<u>Bothriochloa ischeamum</u>)	ARS, Woodward, OK	1984
Limpograss (<u>Hemarthria altissima</u>)	SCS, Brooksville, FL	1984
Bitter Panicum (<u>Panicum amarum</u>)	SCS, Brooksville, FL	1985
Blue Panicum (<u>P. antidotale</u>)	SCS, Knox City, TX	1985
Brunswickgrass (<u>Paspalum nicorae</u>)	SCS, Americus, GA	1984
Indiangrass (<u>Sorghastrum nutans</u>)	SCS, Various PMCs	1984

As the projects are completed, the data will be analyzed and presented in technical notes.

STEP 3: INITIAL OR SMALL SCALE INCREASE

When an initial evaluation has been completed and accessions with superior qualities have been selected, they are increased in small plots to provide material for additional testing. In 1984, no accessions were in small scale increase that are not described in the advanced testing discussion.

STEP 4: ADVANCED TESTING AND FIELD EVALUATION PLANTINGS

When sufficient material is on hand, the accessions selected as superior in initial evaluation are tested for ability to solve one or more of the major problems in the PMCs Long Range Program. The selected accessions are compared with standards, plant now considered as best to solve the problem.

Reseeding Soybean

Glycine soja Sieb. & Zucc.

(also called G. ussuriensis)

PI-163453; MS-128

This vining, annual legume is a relative of commercial soybean. It produces many small, hard seeds that persist all winter and reseed in the spring. It has been tested extensively for wildlife use. 'Bobwhite' soybean, a similar but earlier variety released by the PMC at Elsberry, Missouri, has been used as a standard for comparison. Both varieties are excellent sources of food for wildlife, but in the South, Bobwhite is less vigorous and matures too early to be useful for gamebirds in the winter months. The foliage of both is so highly desirable by deer that small planting may be completely devoured, a decided disadvantage where deer are abundant.

Tests at the PMC and in the field are near completion. The data are to be summarized in 1985 to be presented to the Release Committee. It has been referred to as MS-128 reseeded soybean for a number of years. No formal name has yet been selected. At the end of 1984, a "Name The Bean Contest" was sponsored by the SCS in Mississippi for its employees. Arrangements are to be made with Mississippi State University for a cooperative release of this plant.

Reseeding soybeans in advanced evaluation showing effects from different rates of fertilizer.



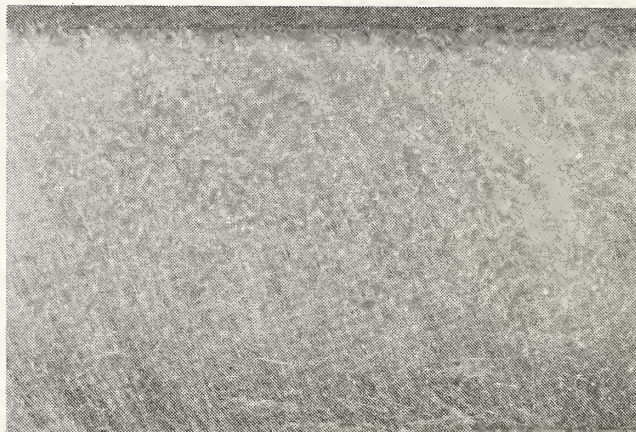
Afghan Reedgrass

Calamagrostis pseudophragmites (Hall f.) Koel

PI-220584; MS-3361

This is a perennial, rhizomatous grass that grows along streams from the Ukraine through central Asia to Siberia. The accession was collected as seed in Afghanistan at an elevation of 5,300 feet. At Coffeerville, it is a prolific producer of plume-like seedheads, but no fertile seed have been obtained. It is successfully established from tillers. It spreads rapidly from rhizomes but is easily destroyed by plowing or herbicides.

The grass is similar to tall fescue with most growth in the spring and fall. It flowers in May and June and is semi-dominant in the summer and winter. Apparent forage quality is good to excellent. Laboratory analysis have shown the grass to have a crude protein content of 16.5 percent at maturity. It appears to have good potential for pasture or hay. It is being tested for use on surface mines, roadsides, and waterways.



Giant Reed

Arundo donax L.

This is a tall, perennial grass that grows clumps of stems from short, thick rhizomes. It produces large plume-like seedheads that are sterile. Stems are killed by a hard freeze but regrowth is rapid in the spring. Plants are propagated readily from rhizomes, and less successfully from stem sections. It is slow to spread and does not become a pest. Because it forms a dense mat of rhizomes, it is difficult to uproot. It has good potential for erosion control on streambanks and shorelines that are sporadically subjected to turbulence.

In 1982, four accessions (PI-432420, PI-432429, PI-432430, PI-432432) were selected for advanced testing from initial evaluations. Several tests were conducted in 1983 to compare the tolerance of the four to adverse conditions. During these trials it was noted that the average size of rhizomes differed for each accession. Progress continued on a study undertaken in 1983 to determine if the differences in performance are due to the size or rhizome rather than the accession. If one accession appears superior as a result of this test, it will be selected as a candidate for release, probably in 1985.

Willows

<u>Species</u>	<u>Accession</u>	<u>Origin</u>
Goat willow (<u>salix caprea</u>)	PI-434284; MS-4417	LA. Tech Arboretum, Ruston
Gilg willow (<u>s. gilgiana</u>)	T-4882; MS-815	NPMC; Beltsville, MD
Erect willow (<u>s. rigida</u>)	T-4885; MS-878	Morton Arboretum, Lisle, IL
Prairie willow (<u>s. humilis</u>)	T-4886; MS-4410	Bryant County, OK

Four species of willow have been selected for advanced testing because they have been less susceptible to disease and insects and performed better at Coffeerville than 'Streamco' purple willow and 'Bankers' dwarf willow, two SCS releases. They produce numerous, small flexible branches from near the base and do not spread from seed like the common black willow.



Field Evaluation Plantings

Advanced testing often includes off-center Field Evaluation Plantings (FEP) to test plants where soil or other conditions strongly contrast with those at the center. These are conducted as a part of the PMC program or in conjunction with other plant materials activity.

In 1984, five new FEP were made to add to seven already established in Arkansas, Louisiana, and Mississippi. The largest established FEP is in the Arkansas Blackland Prairie near Nashville where the heavy, droughty soils contrast sharply with the friable silt loam at the center.

Eight of the FEPs are part of a regional program to assist PMCs at Americus, Georgia and Brooksville, Florida with advanced testing of marshhay cordgrass (Spartina patens). Five accessions of marshhay cordgrass, plus two promising accessions from Cape May, New Jersey for standards, were planted in the FEPs. A new planting of bitter panicum was planted at Grand Isle, Louisiana.

STEP 5: FIELD OR LARGE SCALE INCREASE

Accessions that are candidates for release are grown in large quantities for the final stages of evaluation. Some of the material continues to be used in advanced evaluations or FEPs, but much is destined for field plantings. Field increases of 'MS-128' reseeded soybean, 'Amcorae' brunswickgrass, and 'Appalow' sericea lespedeza were grown in 1984.

STEP 6: FIELD PLANTINGS

The last step in evaluating a candidate for release by a PMC is the field planting (not to be confused with FEP). In field plantings, the test plant is compared to standards (best plants currently available for that purpose) in actual field situations. At this point, the test plants are still in the experimental stage and are not to be harvested and sold before they are formally released.

Prior to field planting, a long-range plan is prepared for the orderly testing of the promising plants. The plantings are usually scheduled over a number of years in a variety of soil and climatic conditions, if possible. Field plantings are coordinated by Plant Materials Specialists who generally serve more than one state, and each state may test plants from several PMCs. The test sites are provided by conservation district cooperators, mining companies, local governments, and others, and the plantings and evaluations are usually conducted through SCS field offices.

In 1984 Field Plantings were initiated for five accessions in advanced testing at the Coffeetown Plant Materials Center. In the initial year, survival was poor in most cases. After results are evaluated in 1985, field test may be interrupted or stopped unless better methods for establishment are developed by the Plant Materials Center in the meantime.

Additional information about field plantings in Arkansas, Louisiana, and Mississippi is included at the back of this booklet.

STEP 7: CULTIVAR RELEASE AND USE

When data from all of the previous steps have been assembled, they are presented to the Agricultural Experiment Station. If it is agreed that the plant is superior, the plant is cooperatively named and released for commercial production and use. The Plant Materials Center has responsibility for breeder and foundation seeds. The Coffeetown PMC maintains foundation fields of four releases. PMCs do not supply the material directly to the general public. They only maintain a small "foundation" block to provide genetically pure stock to qualified growers who supply the users.

'Meechee' arrowleaf clover is a robust, late-maturing variety that produces large amounts of forage.



'Wilmington' bahiagrass was selected because it was more cold-tolerant than Pensacola and had the potential to expand the range of bahiagrass farther north.

'Chiwapa' Japanese millet is a tall grass that grows well on wet soils and was released for wildlife.



'Halifax' maidencane is rhizomatous grass, native to wet areas, that was released for erosion control on shorelines and stream channels.

REPORT OF FIELD PLANTINGS IN ARKANSAS, LOUISIANA, AND MISSISSIPPI

Plants are produced by a PMC primarily to solve problems in its service area, but frequently plants have a much broader application. Since the Coffeerville service area includes most of these three Delta States, this report is also included in this PMC Annual Report. Plants produced by the Coffeerville PMC are tested in other states, and plants from other PMCs are tested in the Delta States. Sometimes plants that have been released by other PMCs have not been adequately tested throughout their potential range and are placed in field plantings.

In 1984 long-range plans for field plantings of 'Rumsey' indiangrass and 'Rountree' big bluestem were developed. These two varieties were selected by the Elsberry PMC in Missouri. These are being tested because a need for warm-season forage has been recognized in northwest Arkansas. Other released varieties will be used for standards. These test are being conducted not only to acquaint people of the Ozark region with available warm-season grasses but also to determine the best performers and their potential range.

Most field plantings require several years to complete and none were completed in 1984. As the field plantings are completed, the data will be analyzed and made available to applicable SCS offices.



Big Bluestem
Andropogon gerardi



Indiangrass
Sorghastrum nutans

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